

**COMMENT RESOLUTION FOR THE
GROUND WATER ASSESSMENT PLAN ADDENDUM,
1989 AND 1990 ANNUAL GROUND WATER MONITORING
REPORTS FOR ROCKY FLATS PLANT**

GENERAL COMMENT: Responses to comments were partially derived from the GW Assessment Plan currently in revision and some sections and tables will change. All currently proposed wells are part of ongoing programs. Additional wells will be proposed annually on the basis of RCRA assessments.

**COMMENT RESOLUTION, CDH COMMENTS ON THE
GROUND WATER ASSESSMENT PLAN ADDENDUM**

Response to Comment 1: SECTION 2.1.2 HYDROGEOLOGY (West Spray Field) The reference to lack of contamination of the ground water within the bedrock sandstones has been removed. The amount of data currently available does not allow this determination to be made.

Response to Comment 2: SECTION 2.1.4 POTENTIAL PATHWAYS AND TRANSPORT MECHANISMS (West Spray Field) The average hydraulic conductivity of the bedrock sandstone has been estimated as 6×10^{-8} cm/s and is provided in section 4.1.1.3, Hydrogeology-Groundwater.

Response to Comment 3: SECTION 2.2.2 FIELD MEASUREMENTS (West Spray Field)

1. All wells in the West Spray Field have water levels measured quarterly and many are also measured monthly. The Groundwater Plan proposes that all wells be measured quarterly for groundwater levels. The past and proposed measuring frequency for the West Spray Field will be provided in table 4.4.

2. This was an incomplete explanation of the potential causes for significant field vs laboratory pH differences of the ground water samples. This statement has been dropped from the report.

Response to Comment 4: SECTION 2.3.1 MONITORING WELLS (West Spray Field) No wells are currently proposed for the West Spray Field. However, none of the proposed monitoring wells at RFP will be completed from 10 feet below to 5 feet above the water table as originally specified here. This change will give a better idea of contaminant transport in the aquifer.

Response to Comment 5: SECTION 2.3.2 FIELD MEASUREMENTS (West Spray Field) Currently, some of the wells at the West Spray Field have monthly groundwater measurements taken and all of

the wells are measured quarterly. Monthly data was entered into RFEDS beginning in 1991. All wells have water levels measured quarterly and 114 wells are also measured monthly. It is proposed that all wells be measured quarterly in the future. The water level measuring frequency for wells in the West Spray Field is listed in table 4-4.

Response to Comment 6: SECTION 3.1.4 POTENTIAL PATHWAYS AND TRANSPORT MECHANISMS (Solar Evaporation Ponds)

1. The source for the contamination north and east of Pond 207-C has not yet been identified but is not believed to be related to the current ponds. This may be related to old ponds or old process lines in the area. This contamination must be further characterized as to source. However, some of the volatile compounds detected at wells north and west of the SEPs have results below detection limits and will not be addressed.

2. The influence of the French Drain on groundwater flow needs to be further evaluated before specific limits can be identified and this is planned as part of the RFI/RI investigation.

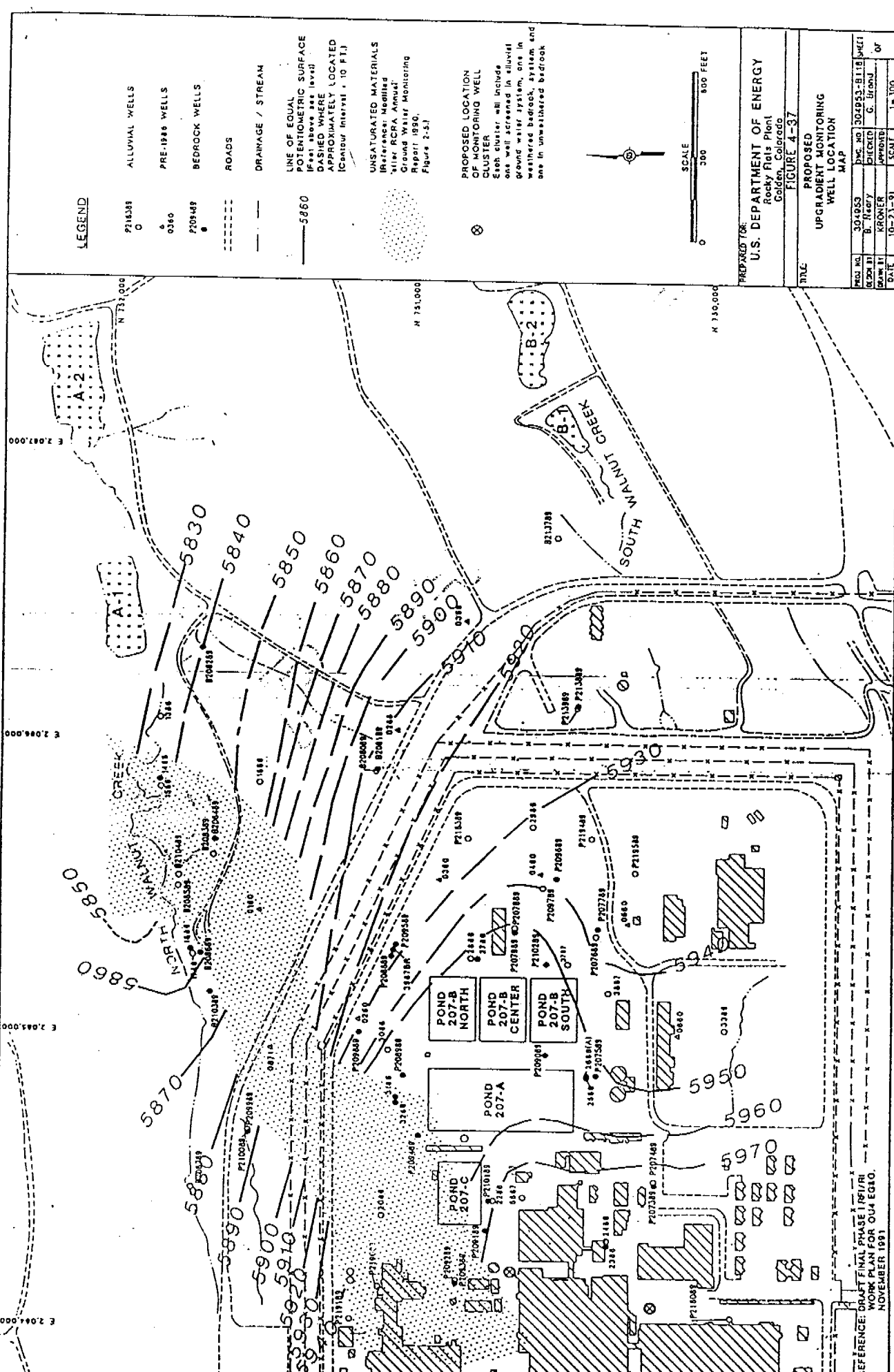
Response to Comment 7: SECTION 3.1.4 FIELD MEASUREMENTS (Solar Evaporation Ponds) Only some of the wells currently have monthly water level information collected and this information has only been readily available since 1991. Therefore reports have been presenting quarterly data which is available for all wells. It is proposed that all wells in the SEP area be measured quarterly. Table 4.25 lists the Solar Evaporation Pond Groundwater Monitoring Wells along with past and proposed sampling frequency. Section 4.3.3.3 Sampling Program and Analytical Methodologies describes the proposed sampling program along with the proposed water level measurement schedule in more detail.

Response to Comment 8: SECTION 3.3 PROPOSED MODIFICATIONS (Solar Evaporation Ponds) Six more wells are proposed upgradient of the SEPs. Attached is a map showing the new proposed monitoring well locations. One set of cluster wells will be located west of the wells 2286 and P210189 to further characterize upgradient contamination. The proposed future activities at the Solar Evaporation Ponds are described in section 4.3.3 Future Activities. Wells are discussed in section 4.3.3.2 Proposed Monitoring Well Locations and section 4.3.3.3 Sampling Program and Analytical Methodologies.

Response to Comment 9: SECTION 3.3.1 MONITORING WELLS - VADOSE ZONE CHARACTERIZATION (Solar Evaporation Ponds) The approximate depth of the vadose zone borings is estimated at 15 to 25 feet. These are further discussed in the RFI/RI work plan.

Response to Comment 10: SECTION 4.1.4 POTENTIAL PATHWAYS AND TRANSPORT MECHANISMS (Present Landfill)

1. More information will be gathered for the Present Landfill.



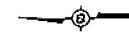
LEGEND

- ALLUVIAL WELLS
○ P118388
- PRE-1988 WELLS
○ 0360
- BEDROCK WELLS
● P201489
- ROADS

- DRAINAGE / STREAM

- LINE OF EQUAL POTENTIOMETRIC SURFACE
(Feet above sea level)
DASHED WHERE APPROXIMATELY LOCATED
(Contour Interval = 10 FT.)
— 5860
- UNSATURATED MATERIALS
Reference: Modified
"Water RCRA Annual"
Ground Water Monitoring
Report 1990,
Figure 2-37

PROPOSED LOCATION OF MONITORING WELL CLUSTER
Every cluster will include one well screened in alluvial ground water system, one in weathered bedrock, system and one in unsaturated bedrock



SCALE
0 300 600 FEET

PREPARED FOR:
U.S. DEPARTMENT OF ENERGY
Rocky Flats Plant
Golden, Colorado

TITLE
PROPOSED MONITORING WELL LOCATION MAP
FIGURE 4-37

| | | | | |
|------------|----------|----------|-------------|-------|
| PROJ. NO. | 304953 | DWG. NO. | 304953-B118 | SHEET |
| REVISED BY | B. RAEY | CHECKED | G. LIND | OF |
| DRAWN BY | KRONER | APPROVED | | |
| DATE | 10-23-91 | SCALE | 1"=300' | |

REFERENCE: DRAFT FINAL PHASE I/II
WORK PLAN FOR OJA EGIO
NOVEMBER 1991

15 new monitoring wells and 11 borings are proposed as part of the RFI/RI work plan for further characterization of the area. Section 4.2.3.2 Proposed Monitor Well Locations lists these new wells.

2. There appear to be seasonal (quarterly) variations in the potentiometric surface at the Present Landfill. Section 4.2.1.3 Hydrogeology- Groundwater System in Surficial and Bedrock Materials describes the seasonal (quarterly) variations in groundwater levels for the Present Landfill surficial material.

3. An evaluation of the effectiveness of the leachate collection system indicates that the surficial material is susceptible to infiltration. Vertical gradients of 0.019 to 1.146 ft/ft have been calculated for the well pair 6487/B206189. This is described in section 4.2.1.3 Hydrogeology-Impact of Landfill Structures on Alluvial Groundwater .

Response to Comment 11: SECTION 4.2.2 FIELD MEASUREMENTS (Present Landfill)

1. At many but not all of the wells in the Present Landfill, water levels are measured monthly. The new Groundwater Plan currently under review proposes that all wells be measured quarterly for groundwater levels. The past and proposed groundwater measuring frequency for individual wells in the Present Landfill will be provided in table 4.15.

2. This was an incomplete explanation of the potential causes for significant field vs laboratory pH differences of the ground water samples. This statement has been dropped from the report.

Response to Comment 12: SECTION 4.2.3. MONITORING WELLS (Present Landfill)

1. The sandstone underlying the Present Landfill needs further characterization to determine if it is a preferential path for groundwater and contamination. However, the results of the Ground Penetrating Radar Survey were unsuccessful in locating bedrock or sand channels and will not be used to locate monitoring wells. Proposed characterization of the bedrock sandstone includes three borings upgradient of the Present Landfill. The deepest well of each cluster is projected to intersect this sandstone. The attached map show the proposed locations. These are described in section 4.2.3.2 Proposed Monitoring Well Locations.

2. For wells constructed in the landfill where the saturated interval exceeds 10 feet, well pairs are now proposed. One well will be screened from three feet above water level to seven feet below and the second well will be screened in the bottom five feet of the saturated zone. These well pairs will more adequately characterize the contamination and determine if there is vertical migration of contaminants. Section 4.2.3.2 Proposed Monitoring Well Locations describes these well pairs.

EXPLANATION

- PROPOSED BORING TO BE SAMPLED AND GAGED AFTER COMPLETION
- PROPOSED MONITORING WELL LOCATIONS
- PROPOSED CPT LOCATIONS
- PROPOSED CLUSTER MONITORING WELL LOCATIONS
- EXISTING ALLOWAY WELL
- EXISTING WEATHERED BEDROCK WELL WITH MEASURED WATER LEVEL SHOWN
- EXISTING UNWEATHERED BEDROCK WELL
- DIRT ROADS
- STREAMS, DITCHES, DRAINAGE FEATURES
- INDIVIDUAL HAZARDOUS SUBSTANCE SITES
- LANDFILL STRUCTURES
- SURFACE WATER IMPOUNDMENTS



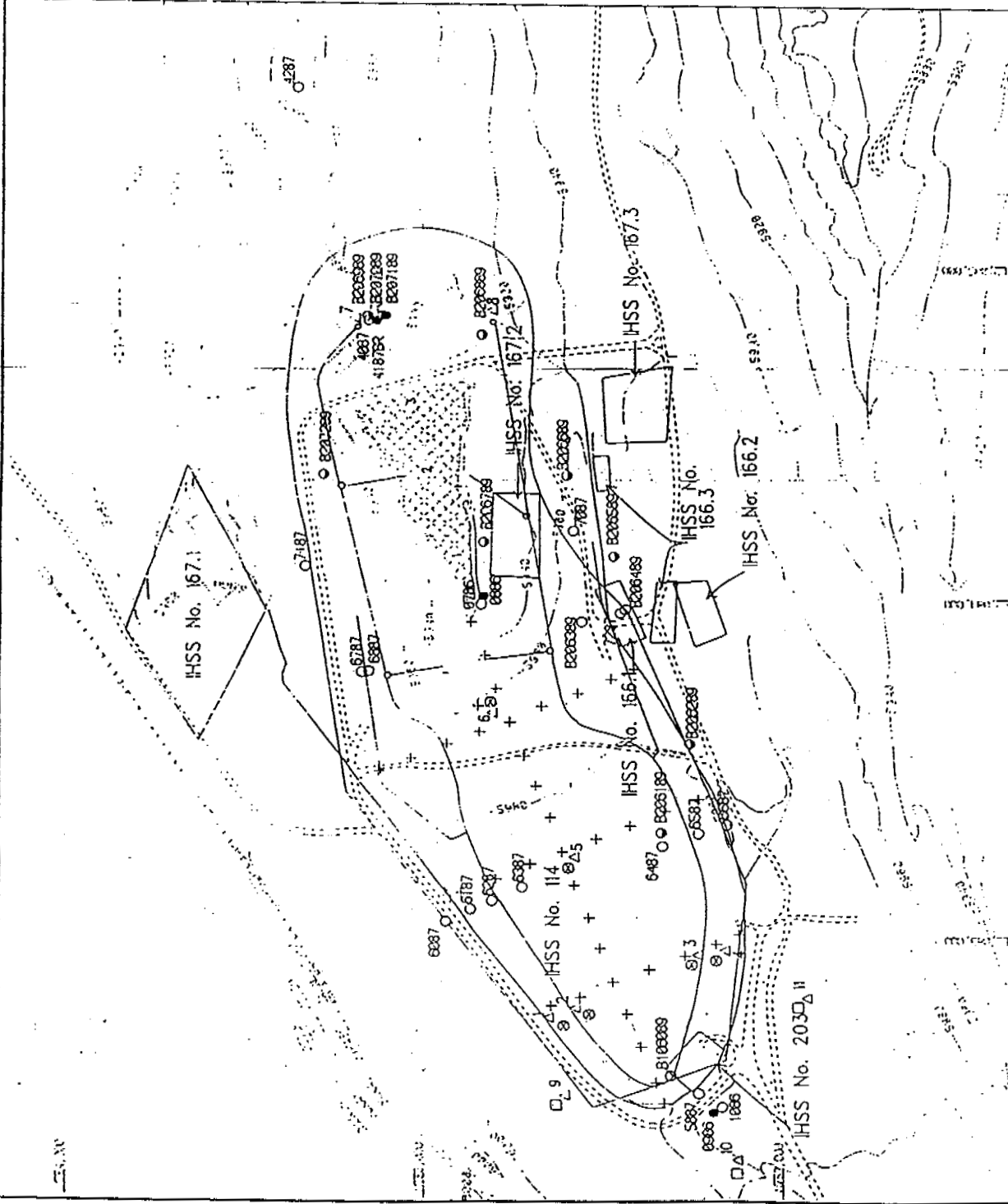
CONTINUOUS INTERVAL = 10 FEET

PREPARED FOR
U.S. DEPARTMENT OF ENERGY
Rocky Flats Plant
Golden, Colorado

FIGURE 4-26

TITLE
PRESENT LANDFILL, PROPOSED LOCATIONS
OF CPTS, BORINGS, AND MONITORING
WELLS, PHASE I RFI/RI

| | | | |
|-------------|--------------|------------|-------------|
| DATE | 11/10/91 | SCALE | AS SHOWN |
| APPROVED BY | W. J. HARRIS | CHECKED BY | G. BRAND |
| DWG. NO. | 304953 | DWG. NO. | 304953-0107 |



REFERENCE: DRAFT FINAL PHASE I RFI/RI
WORK PLAN FOR THE PRESENT LANDFILL
DOE, AUGUST 1991.

Response to Comment 13: SECTION 4.2.3. MONITORING WELLS - PIEZOMETERS (Present Landfill)

1. The construction details of the groundwater diversion and leachate collection system are not covered as part of the Groundwater Assessment Plan. These structures should be researched independently to determine their construction details.

2. Piezometers are no longer proposed for the Present Landfill. All monitoring wells proposed for the area will have groundwater level measurements taken quarterly.

Response to Comment 14: SECTION 4.2.4. FIELD MEASUREMENTS (Present Landfill) Water levels are measured the first week of each quarter as part of the quarterly sampling program.

Response to Comment 15: SECTION 6.2 DATA REPORTING

1. Quarterly evaluations of the groundwater monitoring program are required. EG&G fully intends to comply with this regulation. Section 1.2 REGULATORY REQUIREMENTS states that groundwater data will be assessed on a quarterly basis.

2. Annual reports currently contain yearly data. Future annual reports will also contain control charts and time series plots that will include data from previous years for comparison purposes.

Response to Comment 16: SECTION 6.3 DATA VALIDATION

The independent subcontractor performing data validation has 30 working days from receipt of the complete data package to validate the results. By contract, the labs are allowed up to 61 days (depending on the analytes) to perform analyses with an additional 5 days to report the data. Therefore, the optimum reporting time is approximately three months from the sampling dates. Rad values often take longer due to the shortage of radiochemistry labs. Nationwide, there are too many samples and too few labs to conduct these analyses.

The data gaps found in recent reports were caused by a number of factors. During and following the change in databases and DOE contractors, many labs did not submit data in electronic format. This data has been identified and most has been data entered into RFEDS. Also, validated data previously required data entry into the RFEDS format which delayed access to the data and caused some of the data gaps. Validated data is now received in RFEDS format on diskette which streamlines the inclusion into RFEDS and makes data accessible much earlier than in the past. Most of the data gaps have now been identified and filled.

Response to Comment 17: SECTION 7.1 BACKGROUND WATER QUALITY PROGRAM Background data will be compared with site specific upgradient wells when available.

Response to Comment 18: SECTION 7.2 PROCEDURES FOR STATISTICAL DETERMINATION OF CONTAMINATION

1. The tolerance intervals for the natural background will be the upper limit of the one-side 95% tolerance interval. If the local upgradient concentration is significantly different from the natural background, the upgradient value will be evaluated to determine the reasoning, and the upgradient value will be used for statistical analyses. Section 3.5.3.1 Statistical Comparisons describes how upgradient water is compared against "average" water and the procedures used to evaluate these occurrences.

2. The Protocol for Quarterly Reports is used to determine when time series plots and control charts are appropriate. Determining factors for time series plots include valid well construction information, upgradient wells must have high detection anomalies, downgradient wells must show elevated concentrations of analytes associated with historical waste management practices and wells must have sufficient monitoring data (at least from first quarter 1989). Control charts require at least 4 quarters of historical data and 8 quarters of new data. These will be included in future annual reports.

Response to Comment 19: SECTION 8.0 GROUNDWATER MONITORING SCHEDULE The criteria used to determine whether wells will be removed from the sampling schedule are:

- viability of the well
- useability of the well
- number of quarters of data collected
- data requirements for the specific Operable Unit

Revised schedules will be provided to CDH for approval when changes are requested.